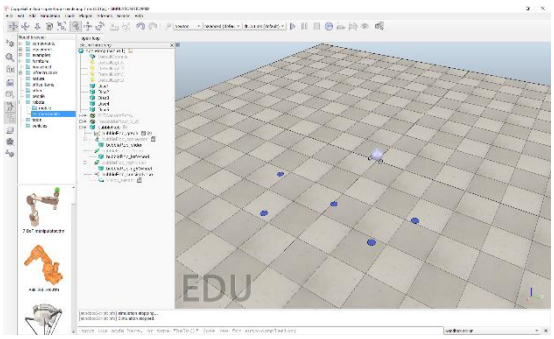
Simulation Assignment 1: Open loop control

Task

Write a code in CoppeliaSim with the file "open-loop-1.ttt" to control the robot to move pass object name "Disc1", "Disc2", …, "Disc5" and stop after it reach "Disc5". The robot can be controlled by calling `sim.setJointTargetVelocity` to set the target velocity of each wheel of the robot. For this task, this is the only way that you can command the robot.



To solve this task, you must issue several calls to `setJointTargetVelocity` with various value at various time. Use your knowledge in basic geometry and basic mechanics to calculate what and when you should command the robot.

Timing is very important in this task. You can use `sim.getSimulationTime()` to get the current time in the simulation.

Objective

To familiarize with the concept of open loop control and in control of the robot.

Scope and Limitation

- You can get the position of the disc, using `sim.getObjectPosition`
- You CANNOT use the position of the robot. The robot will start exactly at position {0,0} but beyond this knowledge, you have no other way to get the current position of the robot (This is the constrain of open loop control). In other words, you are not allow to use any sensor nor calling `sim.getObjectPosition` of the robot.
- When the robot moves close to any discs, the color of the discs will change to indicate to give you a visual cue that the robot pass that this. Do not use this information in your code to check when the robot has reached the disc.
- In the final submission, you must NOT modify any function other than `sysCall_actuation()`, you can add more function though.
- In your code, DO NOT use `sim.setObjectPoisition` to move any objects around. You have to control the robot using `sim.setJointTargetVelocity` only.

Scoring

- There are 3 (unknown) test cases, each test case will have different position for discs. In each test case, your program will be tested by running and check if you can reach all 5 discs and stop.
- Your program should pass at least 2 of these 3 test cases.

Additional Information

- You can change the position of the disc by moving the disc around or modifying line 33 in the script of BubbleRob and uncomment line 44 (which set the position of the disc with the data from line 33)
    - See the next page for the figure of the code

```
    pos = { {  1, 2 },
            { -3, 4 },
            {  6, 4 },
            {  2,-3 },
            { -2,-2 },
          }
  timestamp  = {}
  for i,h in ipairs(discs) do
    sim.setShapeColor(h,nil,sim.colorcomponent_ambient_diffuse,{.3,.4,.9})
    timestamp[i] = nil
    -- the next line set the position to pos
    -- sim.setObjectPosition(h,-1,{pos[i][1], pos[i][2], 0.002})
```